Canon

ENGLISH

F-718S/F-719SG

Scientific Calculator

Thank you for purchasing Canon Scientific Calculator.
The F-718S / F-719SG features 264
(In F-718S only) / 302 (In F-719SG only) scientific,
statistical and other advanced functions such as LCM, GCD,
Quotient & Remainder Calculation, 38 built in formula
(In F-719SG only) and many more.

We recommend you to read this user manual and all the
important notices before you start using the
F-718S / F-719SG.
Please keep this user manual with you for future use.

PRINTED IN CHINA

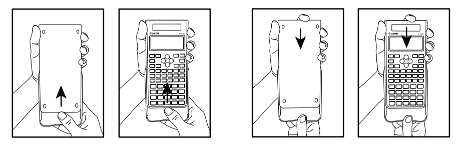
E-IE-408

CONTENTS

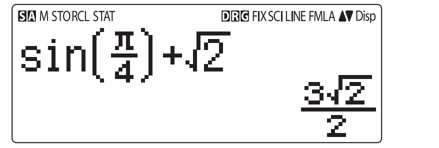
DISPLAY (4-line Dot Matrix DISPLAY) .... P. 3
GETTING STARTED .... P. 4
  Power ON, OFF .... P. 4
  Display Contrast Adjustment .... P. 4
  Mode Selection .... P. 4
  Calculator Set-up Menu .... P. 5
  Before Using the Calculator .... P. 7
INPUTTING EXPRESSIONS AND VALUES .... P. 8
  Input Capacity .... P. 8
  Input Editing .... P. 8
  Inputting and Display result in Mathematics Mode .... P. 11
INPUT RANGE AND ERROR MESSAGE .... P. 11
  Calculation Precision, Input Range .... P. 11
  Order of Operations .... P. 14
  Calculation Stacks .... P. 16
  Error Message and Error Locator .... P. 16
BASIC CALCULATIONS .... P. 17
  Arithmetic Calculations .... P. 17
  Memory Calculations .... P. 17
  Fraction Calculations .... P. 19
  Percentage Calculations .... P. 20
  Degree-Minutes-Seconds Calculations .... P. 20
  Reply & Multi-statements .... P. 21
FUNCTIONAL SCIENTIFIC CALCULATIONS .... P. 22
  Square, Root, Cube, Cube Root, Power Root, Reciprocal and pi .... P. 22
  Logarithm, Natural Logarithm, Antilogarithm and logab .... P. 22
  Angle Unit Conversion .... P. 22
  Trigonometry Calculations .... P. 23
  Permutation, Combination, Factorials and Random Number Generation .... P. 24
  Least Common Multiple and Greatest Common Divisor .... P. 25
  Quotient and Remainder Calculations .... P. 26
  Coordinate Conversion .... P. 26
  Absolute Value Calculations .... P. 27
  Engineering Notation .... P. 27
  Display Values Exchange .... P. 28
STATISTICAL CALCULATIONS .... P. 29
  Statistical Type Setection .... P. 29
  Statistical Data Input .... P. 29
  Editing Statistical Sample Data .... P. 30
  Statistical Calculation Screen .... P. 31
  Statistical Menu .... P. 31
  Statistical Calculation Example .... P. 33
FUNCTION (x, y) TABLE CALCULATION .... P. 34
FORMULA CALCULATION FUNCTION (In F-719SG only) .... P. 36
BATTERY REPLACEMENT .... P. 38
ADVICE AND PRECAUTIONS .... P. 39
SPECIFICATIONS .... P. 40

How to use the Slide Cover

Open or close the cover by sliding as shown in the figure.



DISPLAY (4-line Dot Matrix DISPLAY)



$\sin\left(\frac{\pi}{4}\right)+\sqrt{2}$

$\frac{3\sqrt{2}}{2}$

<Status Indicators>

S : Shift key
A : Alpha key
M : Independent memory
STO : Store memory
RCL : Recall memory
STAT : Statistics mode
D : Degree Mode
R : Radian Mode
G : Gradient Mode
FIX : Fixed-decimal setting.
SCI : Scientific Notation
LINE : Line Display mode
FMLA : Formula Calculation (For F-719SG only)
▲ : Up Arrow
▼ : Down Arrow
Disp : Multi-statements Display

GETTING STARTED

Power ON, OFF

- **First time operation:**

1. Pull out the battery insulation sheet.
2. Press ON Shift CLR 3 = CA to reset the calculator.

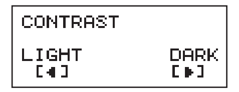
Power ON: When ON is pressed.

Power OFF: Shift OFF are pressed.

- **Auto Power off Function:**
When the calculator is not used for about **7 minutes**, it will automatically power off.

Display Contrast Adjustment

- Press Shift SET-UP ▼ 5 (5: ◀ CONT ▶), enter the Display Contrast Adjustment screen.



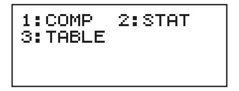
```
CONTRAST

LIGHT        DARK
 [◀]          [▶]
```

Press ▶ to make the display contrast darken.
Press ◀ to make the display contrast lighten.
Press CA or ON to confirm and clear the screen.

- To initialize the LCD contrast, press Shift CLR 3 = CA outside the **Display Contrast Adjustment** screen.

Mode Selection

- Press MODE to enter the Calculation Mode Selection screen.
- Press 1, 2, 3 to select the calculation mode.



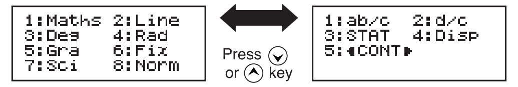
```
1:COMP   2:STAT
3:TABLE
```

Operation	Mode		LCD Indicator
MODE 1	COMP	Normal calculation	
MODE 2	STAT	Statistical calculation	STAT
MODE 3	TABLE	Function Table calculation	

- Initial mode is COMP mode.

Calculator Set-up Menu

- Press Shift SET-UP to enter the **Calculator Set-up Menu**; press ▼ / ▲ for next / previous page.



```
1:Maths  2:Line
3:Deg    4:Rad
5:Gra    6:Fix
7:Sci    8:Norm
```

Press ▼ or ▲ key

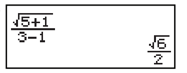
```
1:ab/c   2:d/c
3:STAT   4:Disp
5:◀CONT▶
```

- **To select the calculator input & output format [1] Maths or [2] Line**
[1] Maths – (Mathematics mode): The majority of calculation input and output (e.g. Fraction, pi, square root number) are shown in Mathematics textbook format.

[2] Line – (Line mode): The majority of calculation input and output are shown in the lines format. And “LINE” icon will be shown.

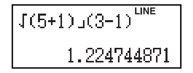
For the STAT mode, the Input & Display format will switch to Line mode automatically.

Mathematics mode



$\frac{\sqrt{5+1}}{3-1}$ $\frac{\sqrt{6}}{2}$

Line mode



```
√(5+1)⌟(3-1)      LINE
       1.224744871
```

- **To select the angle unit [3] Deg, [4] Rad or [5] Gra**
[3] Deg: Angle unit in Degree
[4] Rad: Angle unit in Radian
[5] Gra: Angle unit in Gradient

$90° = \frac{\pi}{2}$ radians = 100grads

- **To select display digit or notation [6] Fix, [7] Sci or [8] Norm**
[6] Fix: Fixed Decimal, [Fix 0~9?] appears, specify the number of decimal places by pressing [0] – [9].
Example: 220 ÷ 7 = 31.4286 (FIX 4)
= 31.43 (FIX 2)

[7] Sci: Scientific Notation, [Sci 0~9?] appears, specify the number of significant digits by pressing [0] – [9].
Example: 220 ÷ 7 = 3.1429×10^1 (SCI 5)
= 3.143×10^1 (SCI 4)

[8] Norm: Exponential Notation, [Norm 1~2?] appears, specify the exponential notation format by pressing [1] or [2].

Norm 1: Exponential notation is automatically used for integer values with more than 10 digits and decimal values with more than **TWO** decimal points.

Norm 2: Exponential notation is automatically used for integer values with more than 10 digits and decimal values with more than **NINE** decimal places.

Example: 1 ÷ 1000 = 1×10^{-3} (Norm 1)
= 0.001 (Norm 2)

- **To select the fraction format [1] a b/c or [2] d/c**
[1] a b/c: specify Mixed fraction display
[2] d/c: specify Improper fraction display

- **To select the statistical display format [3] STAT ([1] ON or [2] OFF)**
[1] ON: Show FREQ (Frequency) Column in Statistical Data Input Screen
[2] OFF: Hide FREQ (Frequency) Column in Statistical Data Input Screen

- **To select the decimal point display format [4] Disp ([1] Dot or [2] Comma)**
[1] Dot: specify dot format for Decimal point result display
[2] Comma: specify comma format for Decimal point result display

- **To Adjust Display contrast [5] ◀ CONT ▶**
See “Display Contrast Adjustment” section.

Before Using the Calculator

- **Check the current Calculation Mode**

Be sure to check the status indicators that indicate the current calculation mode (COMP, STAT, TABLE), display formats setting and angle unit setting (Deg, Rad, Gra)

- **Return to initial setup**

Pressing Shift CLR 1 SET-UP = (YES) CA to return the initial calculator setup

Calculation mode : COMP
Input/Output Format : Maths
Angle unit : Deg
Display Digits : Norm 1
Fraction Display Format : d/c
Statistical Data Input : OFF
Decimal Point format : Dot

This action will not clear the variable memories.

- **Initialize the calculator**

When you are not sure of the current calculator setting, you are recommended to initialize the calculator (calculation mode “COMP”, angle unit “Degree”, and clear reply and variable memories), and LCD contrast by pressing Shift CLR 3 (All) = (YES) CA.

INPUTTING EXPRESSIONS AND VALUES

Input Capacity

F-718S / F-719SG allows you to input a single calculation up to 99 bytes. Normally, one byte is used as each time you press one of the numeric keys, arithmetic keys, scientific function keys or Ans. Some functions require 4 – 13bytes. Shift, Alpha, and the direction keys will not use up any bytes. When input capacity is less than 10bytes, the input cursor will change from “ ▍ ” to “ █ ” that notifying the memory is running now.

Input Editing

- New Input begins on the left of display. If input data are more than 15 characters, the line will scroll to the right consecutively. You can scroll back to the left by using ◀ and ▶ to review the input
- In Line mode, press ▲ to let the cursor jump to the beginning of inputting, while ▼ will jump to the end.
- In Mathematics mode, press ▶ to let the cursor jump to the beginning of inputting while it is at the end of the input calculation. Or press ◀ to let the cursor jump to the end of inputting while it is at the beginning of the input calculation.

- Omit the multiplication sign and final close parenthesis.

Example: 2 x log 100 x (1+3) = 16

	Operation 1:	Display 1
Including × *1,) *2,) *3	2 × log 1 0 0) × (1 + 3) = *2 *1 *3	2xlog(100) x (1+3) 16
	Operation 2:	**Display 2**
Omitting × *1, Omitting) *3	2 log 1 0 0) (1 + 3 =	2log(100)(1+3 16

*1. Omit multiplication sign (x)
  - Input before an open parentheses (: 1 x (2+3)
  - Input before scientific functions that includes parenthesis: 2 x cos(30)
  - Input before Random number function Rand
  - Input before Variable (A, B, C, D, X, Y, M), π, e

*2. Scientific functions come with the open parenthesis. Example: sin(, cos(, Pol(, LCM(…. You need to input the argument and the close parenthesis).

*3. Omit the last close parenthesis before the =, M+, M-, Shift STO and FMLA (Only for F-719SG).

- **Insert and overwrite Input mode**

In Line mode, you can use INSERT Insert or overwrite mode for inputting.
  - In Insert mode (Default input mode), the cursor is a vertical flashing line “ I ” for inserting a new character.
  - In overwrite mode, press Shift Insert key to switch the cursor to a flashing horizontal (_) and replace the character at the current cursor position.

In Mathematics mode, you can only use the insert mode.

Whenever the display format changes from Line mode to Mathematics mode, it will automatically switch to the insert mode.

- **Deleting and Correcting an Expression**

In insert mode: Move the cursor to the right of the character or function that needs to be deleted, then press DEL.

In overwrite mode: Move the cursor under the character or function being deleted, then press DEL.

Example: 1234567 + 889900

(1) Replace an entry (1234567 → 1234560)

Mode Setting	Key In operation	Display (input Line only)
Method 1: Line/Math mode - Insert mode	1234567 + 889900 ◀ 7 times	1234567I+889900
	DEL 0	1234560I+889900
Method 2: Line mode - Overwrite mode	Shift SET-UP 2 1234567 + 889900 Shift Insert	1234567+889900_
	◀ 8 times	1234567+889900
	0	1234560+889900

(2) Deletion (1234567 → 134567)

Method 1: Line/Math mode - Insert mode	◀ 12times	12I34567+889900
	DEL	134567+889900
Method 2: Line mode - Overwrite mode	Shift Insert	1234567+889900_
	◀ 13times	1234567+889900
	DEL	134567+889900

(3) Insertion (889900 → 2889900)

Line/Math mode - Insert mode	◀ 6times	1234567+I889900
	2	1234567+2I889900

Inputting and Display result in Mathematics Mode

- In Mathematic Mode, the Input and display result of fraction or certain functions (log, x^2, x^3, $x^{■}$, $\sqrt{■}$, $\sqrt[3]{■}$, $\sqrt[■]{□}$, x^{-1}, $10^{■}$, $e^{■}$, Abs) is shown in Handwriting/Mathematics format.

MATHEMATICS MODE: Shift SET-UP 1

Example in Math mode	Key in operation	Display
$\left\lvert \sqrt{3}-\frac{2}{\sqrt{2}} \right\rvert$	Abs √ 3 ▶ − 2 d/c √ 2 =	$\left\lvert \sqrt{3}-\frac{2}{\sqrt{2}} \right\rvert$ $\sqrt{3}-\sqrt{2}$

Remark

(1) Some input expressions cause the height of a calculation expression to be greater than one display screen. Maximum input capacity: 2 display screen (31 dots x 2).
(2) Calculator memory limits how many functions or perentheses can be input in any single expression. In this case divide the expression into multiple parts and calculate separately.
(3) If part of the expression you input is cut off after calculation and in the result display screen you can press ◀ or ▶ to view the full expression.

INPUT RANGE AND ERROR MESSAGE

Calculation Precision, Input Range

Number of Digits for Internal Calculation	Up to 18 digits
Precision*	±1 at the 10th digit for a single calculation. ±1 at the least significant for exponential display
Calculation Range	$\pm 1 \times 10^{-99}$ to $\pm 9.999999999 \times 10^{99}$ or 0

- **Function Calculation Input Ranges**

Functions		Input Range
sinx	DEG	$0 \leqq \lvert x \rvert < 9\times10^9$
	RAD	$0 \leqq \lvert x \rvert < 157\ 079\ 632.7$
	GRA	$0 \leqq \lvert x \rvert < 1\times10^{10}$
cosx	DEG	$0 \leqq \lvert x \rvert < 9\times10^9$
	RAD	$0 \leqq \lvert x \rvert < 157\ 079\ 632.7$
	GRA	$0 \leqq \lvert x \rvert < 1\times10^{10}$
tanx	DEG	Same as sinx, except when $\lvert x \rvert = (2n-1)\times90$
	RAD	Same as sinx, except when $\lvert x \rvert = (2n-1)\times\pi/2$
	GRA	Same as sinx, except when $\lvert x \rvert = (2n-1)\times100$
$\sin^{-1}x$		$0 \leqq \lvert x \rvert \leqq 1$
$\cos^{-1}x$		
$\tan^{-1}x$		$0 \leqq \lvert x \rvert \leqq 9.999\ 999\ 999\times10^{99}$
sinhx		$0 \leqq \lvert x \rvert \leqq 230\ 258\ 509\ 2$
coshx		
$\sinh^{-1}x$		$0 \leqq \lvert x \rvert \leqq 4.999\ 999\ 999\times10^{99}$
$\cosh^{-1}x$		$1 \leqq x \leqq 4.999\ 999\ 999\times10^{99}$
tanhx		$0 \leqq \lvert x \rvert \leqq 9.999\ 999\ 999\times10^{99}$
$\tanh^{-1}x$		$0 \leqq \lvert x \rvert \leqq 9.999\ 999\ 999\times10^{-1}$
logx/lnx		$0 < x \leqq 9.999\ 999\ 999\times10^{99}$
10^x		$-9.999\ 999\ 999\times10^{99} \leqq x \leqq 99.999\ 999\ 99$
e^x		$-9.999\ 999\ 999\times10^{99} \leqq x \leqq 230.258\ 509\ 2$
$\sqrt{x}$		$0 \leqq x < 1\times10^{100}$
x^2		$\lvert x \rvert < 1\times10^{50}$
x^3		$\lvert x \rvert\ 2.154\ 434\ 69\times10^{33}$
x^{-1}		$\lvert x \rvert < 1\times100^{100}, x \neq 0$
$\sqrt[3]{x}$		$\lvert x \rvert < 1\times10^{100}$
x!		$0 \leqq x \leqq 69$ (x is an integer)
nPr		$0 \leqq n < 1\times10^{10}$, $0 \leqq r \leqq n$ (n,r are integers)
		$1 \leqq \{n!/((n-r)!)\} < 1\times10^{100}$
nCr		$0 \leqq n < 1\times10^{10}$, $0 \leqq r \leqq n$ (n,r are integers)
		$1 \leqq n!/r! < 1\times10^{100}$ or $1 \leqq n!/(n-r)! < 1\times10^{100}$

Functions	Input Range
Pol(x,y)	$\lvert x \rvert, \lvert y \rvert \leqq 9.999\ 999\ 999\times10^{99}$ $\sqrt{x^2+y^2} \leqq 9.999\ 999\ 999\times10^{99}$
Rec(r,θ)	$0 \leqq r \leqq 9.999\ 999\ 999\times10^{99}$ θ : Same as sinx
° ′ ″	$\lvert a \rvert, b, c < 1\times10^{100}$ $0 \leqq b, c$ The display seconds value is subject to an error of +/-1 at the second decimal place
◀ ° ″	$\lvert x \rvert < 1\times10^{100}$ Deciaml ↔ Sexagesimal Conversions $0°0'0'' \leqq \lvert x \rvert \leqq 9999999°59'59''$
^(x^y)	$x>0: -1\times10^{100} < y\log x < 100$ $x=0: y>0$ $x<0: y=n, m/(2n+1)$ (m,n are integers) However: $-1\times10^{100} < y\log\lvert x \rvert < 100$
$^x\sqrt{y}$	$y>0: x \neq 0, -1\times10^{100} < 1/x \log y < 100$ $y=0: x>0$ $y<0: x=2n+1, (2n+1)/m$ ($m\neq0$; m,n are integers) However: $-1\times10^{100} < (1/x)\log\lvert y \rvert < 100$
a b/c	Total of integer, numerator, and denominator must be 10 digits or less (including division marks).
i~Rand(a,b)	$0 \leqq a < 1\times10^{10}$, $0 \leqq b < 1\times10^{10}$ (a,b should be positive integers or 0)
Rand	Result generates a 3 digits pseudo random number(0.000~0.999)
LCM(x,y,z)	$0 < x, y, z \leqq 9.999\ 999\ 999\times10^{12}$ (positive integers) Default result when x, y, z=0
GCD(x,y,z)	$0 < x, y, z \leqq 9.999\ 999\ 999\times10^{12}$ (positive integers) Default result when x, y, z=0
Q…r(x,y)	$0 < x, y \leqq 9.999\ 999\ 999\times10^{12}$ (positive integers) $0 \leqq Q \leqq 999\ 999\ 9999$, $0 \leqq r \leqq 999\ 999\ 9999$ (Q,r are integers) Default result when x=0

Functions	Input Range
Abs	$\lvert x \rvert < 1\times10^{100}$
One-variable Statistical calculation	$\lvert x \rvert < 1\times10^{100}$ $\lvert FREQ \rvert < 1\times10^{100}$
Two-variable Statistical calculation	$\lvert x \rvert < 1\times10^{100}$ $\lvert y \rvert < 1\times10^{100}$ $\lvert FREQ \rvert < 1\times10^{100}$

- Errors are cumulative in the case of consecutive calculations, this is also true as internal consecutive calculation are performed in the case of ^(x^y), $^x\sqrt{y}$, $^3\sqrt{}$, x!, nPr, nCr , etc. And may become large.

- **Display of results using √**

Calculation results may be displayed using √ when all of the following cases:-

1. When intermediate and final calculation results are displayed in the following form:

$$\pm\frac{a\sqrt{b}}{c}\pm\frac{d\sqrt{e}}{f} \qquad \begin{array}{ll} 0 \le a < 100, & 1 \le d < 100 \\ 0 \le b < 1000, & 1 < e < 1000 \\ 1 \le c < 100, & 1 \le f < 100 \end{array}$$

2. When the number of terms in the intermediate and final calculation result is one or two.

Order of Operations

This calculator will automatically determine the operation priority of each individual command as follows:-

1st Priority	Recall memory (A, B, C, D, 0-9), Rand
2nd	Calculation within parentheses ( ).
3rd	Function with parenthesis that request the input argument to the right Pol(, Rec(, sin(, cos(, tan(, $\sin^{-1}$(, $\cos^{-1}$(, $\tan^{-1}$(, sinh(, cosh(, tanh(, $\sinh^{-1}$(, $\cosh^{-1}$(, $\tanh^{-1}$(, log(, ln(, e^(, 10^(,√(, $^3\sqrt{}$(, Abs(, ROUND(, LCM(, GCD(, Q…r(, i~Rand(,
4th	Functions that come after the input value preceded by values, powers, power roots: x^2, x^3, x^{-1}, x!, ° ′ ″, °, r, g, ^(, $^x\sqrt{}$(, Percent %, $\log_a b$, EXP
5th	Fractions: a b/c, d/c
6th	Prefix symbol: (–) (negative sign)
7th	Statistical estimated value calculation: $\hat{x}$, $\hat{y}$, $\hat{x}1$, $\hat{x}2$
8th	Multiplication where sign is omitted: Multiplication sign omitted immediately before π, e, variables (2π, 5A, πA, etc.), functions with parentheses (2√(3), Asin(30), etc.)
9th	Permutations, combinations: nPr, nCr
10th	Multiplication and division: ×, ÷
11th	Addition and subtraction: +, –
12th	Calculation ending instruction: =, M+,M- STO(store memory),FMLA

- In the same precedence level, calculations are performed from left to right.
- Operation enclosed within parentheses is performed first. When a calculation contains an argument that is a negative number, the negative number must be enclosed within parentheses.

Example:

(–) 2 x^2 = $-2^2 = -4$

((–) 2) x^2 = $(-2)^2 = 4$

- When same priority commands are mixed into one calculation.

Example 1:

1 ÷ 2 Shift π = 1 ÷ 2π = 0.1591549431

Example 2:

2 Shift STO (–) 2 → A

1 ÷ 2 Alpha A = $1 \div 2A = \frac{1}{4}$

Calculation Stacks

- This calculator uses memory areas, called “stacks”, to temporarily store numeric value (numbers) and commands (+, –, x…) according to their precedence during calculations.
- The numeric stack has 10 levels and command stack has 128 levels. A stack error [Stack ERROR] occurs whenever you try to perform a calculation that exceeds the capacity of stacks.
- Calculations are performed in sequence according to “Order of Operations”. After the calculation is performed, the stored stack values will be released.

Error Messages and Error locator

The calculator is locked up while an error message is shown on the display to indicate the cause of the error.

- Press CA to clear the error message, then return to the initial display of latest mode.
- Press ◀ or ▶ to display input expression with the cursor positioned next to the error.
- Press ON to clear the error message, clear the replay memory history and return to the initial display of the latest mode.

Error Message	Cause	Action
Math ERROR	• The intermediate or final result is outside the allowable calculation range. • An attempt to perform a calculation using a value that exceeds the allowable input range. • An attempt to perform an illogical operation (division by zero, etc.)	Check the input values and make sure they are all within the allowable ranges, Pay special attention to values in any using memory areas
Stack ERROR	• The capacity of the numeric stack or operator stack is exceeded.	• Simplify the calculation. • Divide the calculation into two or more separate parts.
Syntax ERROR	An attempt to perform an illegal mathematical operation.	Press ◀ or ▶ to display the cursor at the location of the error, make appropriate corrections
Insufficient MEM	The calculation result of Function Table mode parameters caused more than 30 x-values to be generated for a table	Narrow the table calculation range by changing the start, end, and step values, and try again.

BASIC CALCULATIONS

- Press MODE 1 to enter COMP mode.
- During the busy calculation, the calculator shows only the indicators (without any calculation result). You can press CA key to interrupt the calculating operation.

Arithmetic Calculations

- To calculate with negative values (exclude the negative exponent) enclose then with parentheses.
- This calculator supports 99 levels of parenthetical expression.

MATHEMATICS MODE: Shift SET-UP 1

Example in Math mode	Key in operation	Display
$(-2.5)^2$	((–) 2 • 5) x^2 =	$(-2.5)^2$ $\frac{25}{4}$
$(4 \times 10^{75})(-2 \times 10^{-79})$	4 EXP 7 5 × (–) 2 EXP (–) 7 9 =	$4_E75x\text{-}2_E\text{-}79$ $-\frac{1}{1250}$

Memory Calculations

Memory Variables

- There are 17 memory variables (0 – 9, A – D, M, X and Y), which store data, results, or dedicated values.
- Store values into memory by pressing Shift STO + Memory variable.
- Recall memory values by pressing RCL + Memory variable.
- Memory content can be cleared by pressing 0 Shift STO + Memory variable.

Example: 23 + 7 → A (30 store into A), calculate 2 sinA and clear memory A.

MATHEMATICS MODE: Shift SET-UP 1

Example in Math mode	Key in operation	Display
23 + 7 → A	2 3 + 7 Shift STO A	23+7→A 30
2 x sin A = 1	2 sin Alpha A =	2sin(A 1
Clear memory	0 Shift STO A	0→A 0

Independent Memory

- Independent memory M uses the same memory area as variable M. It is convenient for calculating cumulative total by just pressing M+ (add to memory) or M- (subtract from memory)
- Memory contents are retained even when the calculator is powered off.
- Clear independent memory (M) by pressing 0 Shift STO M
- Clear all memory values by pressing Shift CLR 2(MCL) = CA

Answer Memory

- The input values or the most recent calculation result will be automatically stored into Answer memory whenever you press =, Shift =, M+, Shift M-, Shift STO. Answer memory can hold up to 18 digits.
- Recall and use the latest stored Answer memory by pressing Ans.
- Answer memory is not updated as an error operation had been performed.
- Answer memory contents can be maintained even if pressing CA, changing the calculation mode, or turning off the calculator.

Example in Math mode	Key in operation	Display
123 + 456 → M+, Ans² = 335,241	1 2 3 + 4 5 6 M+ x^2 =	Ans^2 335241
789900 – Ans = 454,659	7 8 9 9 0 0 − Ans =	789900-Ans 454659

Fraction Calculations

The calculator supports Fraction calculation and the conversions between Fraction, Decimal point, Mixed fraction and Improper fraction.

- Specify the fraction calculation result display format by either **mixed fraction (a b/c)** or **improper fraction (d/c)** in set-up menu.
- At the default setting, fractions are displayed as improper fractions (d/c).
- Mixed Fraction display result only available after set the (a b/c) in the setup menu.

	Improper Fraction (d/c)	Mixed Fraction (a b/c)
Math Mode	$\frac{11}{3}$	$3\frac{2}{3}$
Line Mode	11_I3	3_I2_I3

- Press F↔D to switch a calculation result between fraction and decimal format.
- Press Shift a b/c↔d/c to switch a calculation result between improper fraction and mixed fraction format.
- Result will be displayed in decimal format automatically whenever the total digit of a fractional value (integer + numerator + denominator + separator marks) exceeds 10.
- As a fraction calculation is mixed with decimal value, the result will be displayed by decimal format.

Fraction ↔ Decimal point conversion

MATHEMATICS MODE: Shift SET-UP 1

Example in Math mode	Key in operation	Display
$1\frac{1}{2}+\frac{5}{6}=\frac{7}{3}$ in Math mode	1 Shift a b/c 1 ▶ 2 ▶ + 5 d/c 6 =	$1\frac{1}{2}+\frac{5}{6}$ $\frac{7}{3}$
$\frac{7}{3}$ ↔ 2.333333333 (Fraction ↔ Decimal)	F↔D	$1\frac{1}{2}+\frac{5}{6}$ 2.333333333
2.333333333 ↔ $2\frac{1}{3}$ (Decimal ↔ Mixed Fraction)	Shift a b/c↔d/c	$1\frac{1}{2}+\frac{5}{6}$ $2\frac{1}{3}$

Percentage Calculations

MATHEMATICS MODE: Shift SET-UP 1

Example in Math mode	Key in operation	Display
To calculate 25% of 820 (Math mode)	8 2 0 × 2 5 Shift % =	820x25% 205
The percentage of 750 against 1250 (Math mode)	7 5 0 ÷ 1 2 5 0 Shift % =	750÷1250% 60

Degree-Minutes-Seconds Calculations

Use degrees (hours), minutes and seconds key to perform a sexagesimal (base-60 notational system) calculation or convert the sexagesimal value into decimal value.

Degree-Minutes-seconds ↔ Decimal points

MATHEMATICS MODE: Shift SET-UP 1

Example in Math mode	Key in operation	Display
86°37’34.2” ÷ 0.7 = 123°45’6” (Math mode)	8 6 ° ′ ″ 3 7 ° ′ ″ 3 4 • 2 ° ′ ″ ÷ 0 • 7 =	86°37 ° 34.2 ° ÷ 0.7 123°45’6”
123°45’6” → 123.7516667 (Math mode)	° ′ ″	86°37 ° 34.2 ° ÷ 0.7 123.7516667
2.3456 → 2°20’44.16” (Math mode)	2 • 3 4 5 6 = ° ′ ″	2.3456 2°20’44.16”

Replay & Multi-statements

Replay Memory Function

- Replay memory is only available in COMP mode.
- After the calculation is executed, the calculation input and result will be stored in the replay memory automatically.
- Pressing ↓ (or ↑) can replay the performed calculation input and result history.
- After obtaining the calculation result on the display, press ← or → to edit the input expression of that result.
- If the ▷ Indicator is on the right side of a calculation result display, you need to press CA and then ← or → to scroll the calculation.
- Replay memory is cleared when you press
  1. Initialize calculator setting by Shift CLR 3 = CA
  2. Change from one calculation mode or display mode to other.
  3. Press ON key.
  4. Press Shift OFF to power off machine.

Multi-statements Function

- Use a colon : to put two or more calculation input together.
- The first executed statement will have "Disp" indicator; and the "Disp" icon will disappeared after the last statement is being executed.

MATHEMATICS MODE: Shift SET-UP 1

Example in Math mode	Key in operation	Display
1x12=12 2+25=27 using a multi-statement in Math mode	1 × 1 2 Alpha : 2 + 2 5	1x12:2+25|
	=	1x12 ▲ Disp 12
	=	2+25 ▲ 27
Replay the previous calculation history 1 x 12 = 12	↑	1x12 ▼ 12

FUNCTIONAL SCIENTIFIC CALCULATIONS

- Press MODE 1 to enter COMP mode.
- π = 3.14159265358979323 24
- e = 2.71828182845904523 24

Square, Root, Cube, Cube Root, Power, Power Root, Reciprocal and Pi

MATHEMATICS MODE: Shift SET-UP 1

Example in Math mode	Key in operation	Display
$\left(\sqrt[3]{2^2+5^3}\right)^{-1}\times\pi$ = 0.6217559776	(Shift ∛ 2 x^2 + 5 x^3 →) x^{-1} × Shift π =	$\left(\sqrt[3]{2^2+5^3}\right)^{-1}\times\pi$ 0.6217559776
$\left(\sqrt[3]{2^6}+\sqrt[5]{243}\right)$ = 7	(Shift ∛ 2 ∧ 6 → → + Shift ˣ√ 5 → 2 4 3 →) =	$\left(\sqrt[3]{2^6}+\sqrt[5]{243}\right)$ 7

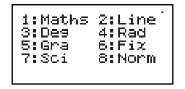
Logarithm, Natural logarithm, Antilogarithm and logab

MATHEMATICS MODE: Shift SET-UP 1

Example in Math mode	Key in operation	Display
$e^{-3}+10^{1.2}+\ln 3$ = 16.99733128	Shift e^x (−) 3 → + Shift 10^x 1 • 2 → + ln 3 =	$e^{-3}+10^{1.2}+\ln(3$ 16.99733128
$\log_3 81-\log 1$ = 4	$\log_a b$ 3 → 8 1 → − log 1 =	$\log_3(81)-\log(1$ 4

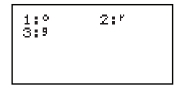
Angle Unit Conversion

The calculator angle unit setting is "Degree". Pressing Shift SET-UP enter the setup menu to change the unit to "Radian" or "Gradient",:


1:Maths 2:Line
3:Deg 4:Rad
5:Gra 6:Fix
7:Sci 8:Norm

Press the corresponding number key 3, 4 or 5 for the angle unit you need. Then the display will show the D, R, G Indicator accordingly.

Convert an angle unit between "Degree", "Radian" and "Gradient" by pressing Shift DRG▸


1:° 2:ʳ
3:ᵍ

Then, pressing 1, 2, or 3 will convert the displayed value into the selected angle unit.

MATHEMATICS MODE: Shift SET-UP 1

Example in Math mode	Key in operation	Display
Convert 180 degree into radian and gradient ($180° = \pi^{\text{Rad}} = 200^{\text{Gad}}$)	Shift SET-UP 4 1 8 0 Shift DRG▸ 1 =	180° R π
	Shift SET-UP 5 =	180° 200

Trigonometry Calculations

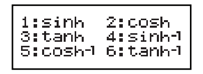
- Before using the trigonometric functions (except hyperbolic calculations), select the appropriate angle unit (Deg/Rad/Gra) by pressing Shift SET-UP.

Angle Unit Setting	Angle Value Input	Input Value Range for form result
Deg	Units of 15°	$\lvert\pi\rvert < 9\times10^9$
Rad	Multiples of $\frac{1}{12}\pi$ radians	$\lvert\pi\rvert < 20\pi$
Gra	Multiples of $\frac{50}{3}$ grads	$\lvert\pi\rvert < 10000$

- 90° = $\frac{\pi}{2}$ Radians = 100 Gradients.

Example in Math mode	Key in operation	Display
Degree Mode	Shift SET-UP 3	D
Sin 60 = $\frac{\sqrt{3}}{2}$	sin 6 0 =	sin(60 $\frac{\sqrt{3}}{2}$
$\frac{1}{Sin45°}$=Cosec 45° = $\sqrt{2}$	sin 4 5) x^{-1} =	sin(45)⁻¹ $\sqrt{2}$

- Hyperbolic (sinh/ cosh/ tanh), Inverse Hyperbolic ($\sinh^{-1}$/$\cosh^{-1}$/$\tanh^{-1}$) functions
- Pressing hyp enter sub-hyperbolic menu.


1:sinh 2:cosh
3:tanh 4:sinh-1
5:cosh-1 6:tanh-1

MATHEMATICS MODE: Shift SET-UP 1

Example in Math mode	Key in operation	Display
sinh2.5 – cosh 2.5 = -0.08208499862	hyp 1 2 • 5) − hyp 2 2 • 5) =	sinh(2.5) – cosh(▷ -0.08208499862
Cosh⁻¹45 = 4.499686191	hyp 5 4 5 =	cosh⁻¹(45 4.499686191

Permutation, Combination, Factorials and Random Number Generation

- Permutation: $_n\mathrm{P}_r = \frac{n!}{(n-r)!}$
- Combination: $_nC_r = \frac{n!}{r!(n-r)!}$
- Factorial: $x! = x(x-1)(x-2)\ldots(2)(1)$

MATHEMATICS MODE: Shift SET-UP 1

Example in Math mode	Key in operation	Display
$_{10}P_3$ = 720	1 0 Shift nPr 3 =	10**P**3 720
$_5C_2$ = 10	5 Shift nCr 2 =	5**C**2 10
5! = 120	5 Shift x! =	5! 120

Random Number Generation

Shift Rand : Generate a random number between 0.000 and 0.999. And the display result will be fraction format in Maths mode status.

Alpha i-Rand : Generate a random number between two specified positive integers. The entry is divided by ","

MATHEMATICS MODE: Shift SET-UP 1

Example in Math mode	Key in operation	Display
Generate a random number between 0.000 & 0.999	Shift Rand =	Rand $\frac{139}{1000}$
Generate an integer from range of 1 to 100	Alpha i-Rand 1 Shift , 1 0 0 =	i~Rand(1,100 33

*The value is only a sample, results will differ each time.

Least Common Multiple and Greatest Common Divisor

- LCM: Calculate the least common multiple among (maximum) three positive integers.
- GCD: Calculate the greatest common divisor among (maximum) three positive integers.

MATHEMATICS MODE: Shift SET-UP 1

Example	Key in operation	Display
LCM(15, 27, 39) = 1755	LCM 1 5 Shift , 2 7 Shift , 3 9 =	LCM(15,27,39 1755

LINE MODE : Shift SET-UP 2

Example	Key in operation	Display
GCD(12, 24, 60) = 12	Shift GCD 1 2 Shift , 2 4 Shift , 6 0 =	GCD(12,24,60 12

Quotient and Remainder Calculations

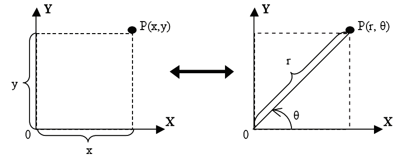
- "Quotient" (Q) is the result of a division problem, "Remainder" (r) is the value remaining in an integer division problem.
- The calculated quotient value (Q) and remainder (r) will be stored into memory variables "C" and "D" automatically assigned.
- In Mathematics mode, press ← or → to scroll a long calculation result.
- In Line mode, the quotient value (Q) and remainder (r) will be shown over 2 line.
- Only Quotient Value (Q) can continue to be used for the next calculation or be stored into memory variables.

LINE MODE : Shift SET-UP 2

Example in Line mode	Key in operation	Display
35 ÷ 10 = 3 x 10 +5 Q=3 R=5 (Line mode)	Q...r 3 5 Shift , 1 0 =	Q…r(35, 10 Q= 3 R= 5
Quotient value (Q) + 3 = 6	+ 3 =	Ans+3 6
Recall Quotient value (Q)	RCL C	C 3
Recall Remainder value (r)	RCL D	D 5

Coordinate Conversion

- With polar coordinates, you can calculate and Display θ within –180° < θ ≤ 180° range. (Same as Radian and Gradient)
- In Mathematics mode, press ← or → to scroll the calculation result.
- In Line mode, (x,y) or (r, θ) will be shown over 2 line.
- After conversion, the results will automatically be assigned to memory variables X and Y. Press RCL X or Y to show the results.



Rectangular Coordinates (Rec)

Polar Coordinates (Pol)

Shift Pol(: Convert rectangular coordinates (x, y) to polar coordinates (r, θ); Press RCL X for r, or RCL Y for θ.

Example in Math mode	Key in operation	Display
With rectangular coordinate (x=1, y= √3). Find Polar coordinate (r, θ) at degree mode	Shift Pol(1 Shift , √ 3 =	Pol(1, √3 r=2, □=60
	RCL X	X 2
	RCL Y	Y 60

Shift Rec(: Convert polar coordinates (r, θ) to rectangular coordinates (x, y); Press RCL X for x, or RCL Y for y.

Example in Line mode	Key in operation	Display
With Polar coordinate (r=2, θ=60°). Find Rectangular coordinate (x, y) at degree mode	Shift Rec(2 Shift , 6 0 =	Rec(2, 60 X= 1 Y= 1.732050808
	RCL X	X 1
	RCL Y	Y 1.732050808

Absolute Value Calculation

Example in Math mode	Key in operation	Display
$\lvert\sin(60-5)\times(-\pi)\rvert$ =2.573442045	Abs sin 6 0 − 5) × ((−) Shift π) =	$\lvert\sin(60-5)\times(-\pi)\rvert$ 2.573442045

Engineering Notation

Example in Line mode	Key in operation	Display
1÷200 = 5×10^{-3} (In Line Mode)	1 ÷ 2 0 0 =	1÷200 5×10^{-3}
	ENG ENG	1÷200 5000×10^{-6}
	Shift ◂ENG	1÷200 5×10^{-3}

Display Values Exchange

- In Mathematics mode, pressing F↔D to change the calculation result value between fraction form ↔ Decimal form, π form ↔ Decimal form, √ form ↔ Decimal form.
- In Line mode, pressing F↔D to **ONLY** change the calculation result value between fraction form ↔ Decimal form, the other π and √ calculation will display the decimal value only.

LINE MODE : Shift SET-UP 2

Example in Line mode	Key in operation	Display
$\frac{2}{3}+2=\frac{8}{3}=2.666666667$ (In Line Mode)	2 d/c 3 + 2 =	2⌟3+2 8⌟3
	F↔D	2⌟3+2 2.666666667

MATHEMATICS MODE: Shift SET-UP 1

Example in Math mode	Key in operation	Display
$\frac{2}{3}+2=\frac{8}{3}=2.666666667$ (In Math Mode)	2 d/c 3 → + 2 =	$\frac{1}{2}+2$ $\frac{8}{3}$
	F↔D	$\frac{2}{3}+2$ 2.666666667

MATHEMATICS MODE: Shift SET-UP 1

Example in Math mode	Key in operation	Display
$\tan 30=\frac{\sqrt{3}}{3}$ =0.5773502692	tan 3 0 =	tan(30 $\frac{\sqrt{3}}{3}$
	F↔D	tan(30 0.5773502692
$\pi\div8=\frac{1}{8}\pi$ =0.3926990817	Shift π ÷ 8 =	$\pi\div8$ $\frac{1}{8}\pi$
	F↔D	$\pi\div8$ 0.3926990817

REMARK

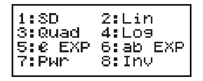
- Some Calculation results, pressing F↔D key will not convert the display value.
- Some display result conversion may take a long time.

STATISTICAL CALCULATIONS

- Press MODE 2 to enter Statistical calculation mode and "STAT" indicator lights up.
- Press Shift STAT 1 (Type) to select the calculation type.

Statistical Type Selection

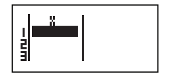
There are 8 types of Statistical Calculation, after entered the **Statistical Type Selection** screen, then press the number to select the type of Statistic Calculation.

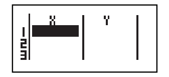

1:SD 2:Lin
3:Quad 4:Log
5:e EXP 6:ab EXP
7:Pwr 8:Inv

Pressing Key	Statistical Calculation
1 (SD)	One-variable statistics (x)
2 (Lin)	Two-variable, Linear regression (y= A+Bx)
3 (Quad)	Two-variable, Quadratic regression ($y=A+Bx+Cx^2$)
4 (Log)	Two-variable, Logarithmic regression (y=AxBlnx)
5 (e EXP)	Two-variable, E exponential regression ($y=Ae^{Bx}$)
6 (ab EXP)	Two-variable, ab Exponential regression ($y=AB^x$)
7 (Pwr)	Two-variable, Power regression ($y=Ax^B$)
8 (Inv)	Two-variable, Inverse regression (Y=A+B/x)

Statistical Data Input

After confirmed the calculation type of the above **Statistical Type Selection** screen or by pressing Shift STAT 2 (Data) in the STAT mode, the following Statistical Data Input screen will be shown.


1-variable STAT


2-variable STAT

- After turned on Data Frequency "FREQ" in calculator's setup menu, the FREQ column will be added into the above screen.
- The followings are the maximum number of line for data input.

Statistic type	FREQ ON	FREQ OFF
Single Variable (only x input)	40	80
2 Variable (x & y input)	26	40

- Input expression and display result value in **Statistical Data Input** screen are in Line mode (same as Comp mode with Line mode status).
- After inputted the data, then press = to store the value into statistical registers and display the value (max. 6 digits) in the cell. And you can press cursor key to move the cursor between each cell.

Editing Statistical Sample Data

Replacing the Data in a cell

(1) In Statistical Data Input screen, move the cursor to cell you want to edit.
(2) Input the new data value or expression, and then press =

Deleting a line

(1) In Statistical Data Input screen, move the cursor to line you want to delete.
(2) Press DEL

Inserting a line

(1) In Statistical Data Input screen, move the cursor to the line that will be under the line being inserted.
(2) Press Shift STAT 3 (Edit)
(3) Press 1 (Line)

Deleting All STAT Data Input

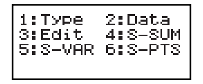
(1) Press Shift STAT 3 (Edit)
(2) Press 2 (Del-A)

Statistical Calculation Screen

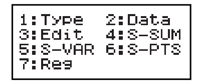
- After inputting the STAT Data, press CA to enter **Statistical Calculation** screen.
- **Statistical Calculation** screen are in Line mode for input & output Display
- Use **Statistical Menu** to calculate the Statistical result. (S-SUM, S-VAR, S-PTS, Reg).

Statistical Menu

In **Statistical Data Input** screen or **Statistical Calculation** screen, you can press Shift STAT to display the **Statistical Menu** screen.


1:Type 2:Data
3:Edit 4:S-SUM
5:S-VAR 6:S-PTS

1-variable STAT


1:Type 2:Data
3:Edit 4:S-SUM
5:S-VAR 6:S-PTS
7:Reg

2-variable STAT

STAT items	Description
[1] Type	To enter the statistical calculation type screen
[2] Data	To enter the statistical Data input screen
[3] Edit	To enter Edit sub-menu for editing STAT editor screen contents
[4] S-SUM	To enter S-Sum sub-menu (calculating sum)
[5] S-VAR	To enter S-Var sub-menu (calculating variable)
[6] S-PTS	To enter S-PTS sub-menu (calculating points)
[7] Reg	To enter Reg sub-menu (Regression calculation)

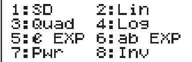
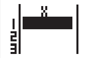
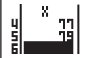
Statistical calculation result in [4] S-SUM, [5] S-VAR, [6] S-PTS, [7] Reg

STAT sub-menu	STAT Type	Value	Symbol	Operation
S-SUM	1 & 2 variable	Summation of all x² value	$\sum x^2$	Shift STAT 4 1
	STAT	Summation of all x value	$\sum x$	Shift STAT 4 2
	2-variable	Summation of all y² value	$\sum y^2$	Shift STAT 4 3
	STAT only	Summation of all y value	$\sum y$	Shift STAT 4 4
		Summation of xy pairs	$\sum xy$	Shift STAT 4 5
		Summation of all x³ value	$\sum x^3$	Shift STAT 4 6
		Summation of all x²y pairs	$\sum x^2y$	Shift STAT 4 7
		Summation of all x⁴ pairs	$\sum x^4$	Shift STAT 4 8
S-VAR	1 & 2	Number of data sample	n	Shift STAT 5 1
	variable	Mean of the x values	$\bar{x}$	Shift STAT 5 2
	STAT	Population standard deviation of x	$x\sigma_n$	Shift STAT 5 3
		Sample Standard Deviation of x	$x\sigma_{n-1}$	Shift STAT 5 4
	2-variable	Mean of the y values	$\bar{y}$	Shift STAT 5 5
	STAT only	Population standard deviation of y	$y\sigma_n$	Shift STAT 5 6
		Sample standard Deviation of y	$y\sigma_{n-1}$	Shift STAT 5 7
S-PTS	1 & 2 variable	Minimum value of X	minX	Shift STAT 6 1
	STAT	Maximum value of X	maxX	Shift STAT 6 2
	2-variable	Minimum value of Y	minY	Shift STAT 6 3
	STAT only	Maximum value of Y	maxY	Shift STAT 6 4
Reg	For non-Quad	Regression coefficient A	A	Shift STAT 7 1
	Reg	Regression coefficient B	B	Shift STAT 7 2
		Correlation coefficient r	r	Shift STAT 7 3
		Estimated value of x	$\hat{x}$	Shift STAT 7 4
		Estimated value of y	$\hat{y}$	Shift STAT 7 5
Reg	For Quad	Regression coefficient A	A	Shift STAT 7 1
	Reg only	Regression coefficient B	B	Shift STAT 7 2
		Regression coefficient C	C	Shift STAT 7 3
		Estimated value of x1	$\hat{x}1$	Shift STAT 7 4
		Estimated value of x2	$\hat{x}2$	Shift STAT 7 5
		Estimated value of y	$\hat{y}$	Shift STAT 7 6

Statistical Calculation Example

SD type Statistical calculation Example:

To calculate $\sum x^2$, $\sum x$, n, $\bar{x}$, $x\sigma_n$, $x\sigma_{n-1}$, minX, maxX of data: 75, 85, 90, 77, 79 in SD mode (Freq: OFF)

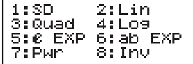
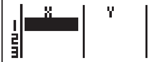
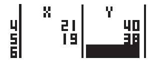
Key in operation	Display
MODE 2	 1:SD 2:Lin 3:Quad 4:Log 5:e EXP 6:ab EXP 7:Pwr 8:Inv
1 (SD)	
7 5 = 8 5 = 9 0 = 7 7 = 7 9 =	
CA Shift STAT 4 1 =	$\sum x^2$ 33120
CA Shift STAT 4 2 =	$\sum x$ 406
CA Shift STAT 5 1 =	n 5
CA Shift STAT 5 2 =	$\bar{x}$ 81.2
CA Shift STAT 5 3 =	$x\sigma_n$ 5.528109984
CA Shift STAT 5 4 =	$x\sigma_{n-1}$ 6.180614856

Quadratic Regression type Statistical Calculation Example:

ABC Company investigate the effectiveness of the advertisement expense in coded units, the following data were obtained:

Advertisement expenses: X	18	35	40	21	19
Effectiveness: y (%)	38	54	59	40	38

Please use the regression to estimate the effectiveness (estimate the value of y) if the advertisement expenses X=30, and estimate the advertisement expenses level (estimate the value of X_1, X_2) for effectiveness y = 50.

Key in operation	Display
MODE 2	 1:SD 2:Lin 3:Quad 4:Log 5:e EXP 6:ab EXP 7:Pwr 8:Inv
3 (Quad)	
1 8 = 3 5 = 4 0 = 2 1 = 1 9 = ↓ → 3 8 = 5 4 = 5 9 = 4 0 = 3 8 =	
CA 3 0 Shift STAT 7 6 =	$30\hat{y}$ 48.69615715
CA 5 0 Shift STAT 7 4 =	$50\hat{x}_1$ 31.30538226
CA 5 0 Shift STAT 7 5 =	$50\hat{x}_2$ -167.1096731

FUNCTION (x,y) TABLE CALCULATION

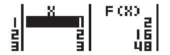
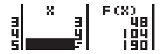
- Input f(x) function to generate the function table for x & f(x).
- **Steps to generate a Number Table**
  1. Enter TABLE Mode
     - Press MODE 3 to enter the Table function calculation.
  2. **Function Input** screen
     - Input function with X variable (Alpha X) to generate Function Table Result.
     - All other variables (A, B, C, D, Y) and independent memory (M) act as the value.
     - Pol, Rec, Q…r function not able to used in Function Input screen.
     - The Function Table Calculation will change X-variable.

3. Input the start, end & step information
   - Input the value, press = to confirm on the following screens
   - Input expression and display result value in following screens are in Line mode status
   - There are maximum of 30 x-values for generate function table. The "Insufficient Error" will be showed if you input the start, end, step value combination is more than 30 x-values.

Display screen	You should input:-
Start?	Input the lower limit of X (Default =1).
End?	Input the upper limit of X (Default = 5). *End value must be greater than the start value.
Step?	Input the increment step (Default =1).

- In **Function Table Result** screen, you cannot edit the content, and press CA return to **Function Input** screen.

Example: $f(x)=x^3+3x^2-2x$ to generate the function table for the range $1\le x\le5$, incremented in steps of 1.

Key in operation	Display
MODE 3	f(x)=
Alpha X x^3 + 3 Alpha X x^2 − 2 Alpha X	f(x)= X³+3X²-2X
= 1 = 5 = 1 =	 1
↓ ↓ ↓ ↓	 5

FORMULA CALCULATION (In F-719SG)

- In COMP mode, you can perform formula calculation from one of the 38 built-in universal formulas. Simply press Shift FMLA key to enter formula calculation mode and the formula selection menu will be shown promptly.

Step to using FMLA Calculation

1. Formula Selection and Display
   - After entered the Formula Selection Menu, pressing ↑ (or ↓) for the next (last) formula page. And pressing = for displaying a formula.
   - To have an instant call for a specific formula before enter Formula Selection Menu.
     1. Input number of that formula
     2. Press Shift FMLA
     3. Press = to confirm
2. Input the value for each variable screen
   - Press = to confirm the input value
   - Only numeric value and pre-stored memories (to recall by RCL + memory variable) can be used as the input of the formula.
3. Exit Formula Calculation
   - Before a formula is confirmed: Press Shift FMLA to exit formula selection menu and return to the latest display.
   - Press CA or ON any time to exit formula menu and return to the initial display of COMP mode.
   - Only Calculation formula result can stored into variable memories via Shift STO

Example: To calculate Circular Area: $S=\pi r^2$, with "r" is 2.5mm

Calculation Expression	Key in operation	Display
Select FMLA 2	2 Shift FMLA	$S=\pi r^2$
Confirm the FMLA	=	r? 0
Enter r value & find the result	2 • 5 =	$S=\pi r^2$ $\frac{25}{4}\pi$

No.	Name of Formula	Formula Equation
1.	Triangular area:	$S=\frac{1}{2}bc\sin A$
2.	Circular area:	$S=\pi r^2$
3.	Fan-shaped area:	$S=\frac{1}{2}r^2\theta$
4.	Parallelogramic area:	$S=ab\sin\theta$
5.	Elliptical area:	$S=\pi ab$
6.	Trapeziform area:	$S=\frac{1}{2}(a+b)h$
7.	Spherical surface area:	$S=4\pi r^2$
8.	Cylindrical surface area:	$S=2\pi r(h+r)$
9.	Spherical volume:	$S=\frac{4}{3}\pi r^3$
10.	Cylindrical volume:	$V=\pi r^2h$
11.	Conical volume:	$V=\frac{1}{3}\pi r^2h$
12.	Sum of arithmetic progression:	$S=\frac{1}{2}n[2a_0+(n-1)d]$
13.	Sum of geometric progression:	$S=\frac{a_0(r^n-1)}{r-1}$
14.	Sum of square number:	$S=\frac{1}{6}n(n+1)(2n+1)$
15.	Sum of cubic number:	$S=(\frac{1}{2}n(n+1))^2$
16.	Distance between arbitrary two points:	$d=\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$
17.	Included angle of the intersecting lines:	$\theta=\tan^{-1}\frac{k2-k1}{1+k1k2}$
18.	Law of cosines:	$a=\sqrt{b^2+c^2-2bc\cos A}$
19.	Law of sines:	$a=2r\sin A$
20.	Displacement of uniformly accelerated linear motion:	$d=v_0t+\frac{1}{2}at^2$
21.	Velocity of uniformly accelerated linear motion:	$v=v_0+at$
22.	Period of circular motion (1):	$T=2\pi r/v$
23.	Period of circular motion (2):	$T=2\pi/\omega$
24.	Period of simple pendulum:	$T=2\pi\sqrt{\frac{1}{g}}$
25.	Electric oscillation frequency:	$f=\frac{1}{2\pi\sqrt{LC}}$
26.	Resistive formula:	$R=p\cdot\frac{1}{S}$
27.	Joule's theorem (1):	$P=\frac{V^2}{R}$
28.	Joule's theorem (2):	$P=I^2R$
29.	Resistance of shunt resistance:	$R=\frac{R1*R2}{R1+R2}$
30.	Kinetic energy:	$E=\frac{1}{2}mv^2$
31.	Gravitational potential energy:	$E=mgh$
32.	Centrifugal force (1):	$F=mv^2/r$

No.	Name of Formula	Formula Equation
33.	Centrifugal force (2):	$F=m\omega^2r$
34.	The law of gravity:	$F=G\frac{Mm}{r^2}$
35.	Electric field intensity:	$E=Q/(4\pi\varepsilon r^2)$
36.	Heron's Formula (Triangular area):	$S=\sqrt{\frac{a+b+c}{2}(\frac{a+b+c}{2}-a)(\frac{a+b+c}{2}-b)(\frac{a+b+c}{2}-c)}$
37.	Refractive index:	$E=\sin i/\sin r$
38.	Critical angle of total reflection:	$\theta=\sin^{-1}(n_2/n_1)$

BATTERY REPLACEMENT

When the display characters are dim or show the follow message on the screen, turn the calculator off and replace the lithium battery immediately.

LOW BATTERY

Please replace the lithium battery using the following procedures,

1. Press Shift OFF to power off the calculator.
2. Remove the screw that securely fixes the battery cover in place.
3. Remove battery cover.
4. Remove the old battery with pen or similar sharp object.
5. Load the new battery with positive "+" side facing up.
6. Replace the battery cover, screw, and press ON, Shift CLR 3 = CA to initialize the calculator.

Caution: Risk of explosion if battery is replaced by an incorrect type. Dispose of used battery according to the instruction.

- Electromagnetic interference or electrostatic discharge may cause the display to malfunction or the contents of the memory to be lost or altered. Should this occur, press ON, Shift CLR 3 = CA to restart the calculator.

ADVICE AND PRECAUTIONS

- This calculator contains precision components such as LSI chips and should not be used in place subject to rapid variations in temperature, excessive humidity dirt or dust, or exposed to direct sunlight.
- The liquid crystal display panel is made of glass and should not be subjected to excessive pressure.
- When cleaning the device do not use a damp cloth or volatile liquid such as paint thinner. Instead, use only a soft, dry cloth.
- Do not under any circumstances dismantle his device. If you believe that the calculator is not functioning properly, either bring or mail the device together with the warranty to service representative of Canon.
- Never dispose the calculator improperly such as burning; it can create risks of personal injury or harm. You are suggested to dispose this product according to your national law.
- Do replace the battery once very two years even it is not used frequently.

Battery Caution!

- Keep the Battery out of reach of children. If the battery is swallowed, contact a doctor immediately.
- Misuse of battery may cause leakage, explosion, damages or personal injury.
- Don't recharge or disassemble the battery, it could cause a short circuit.
- Never expose the battery to high temperatures, direct heat, or dispose by incineration.
- Never leave a dead battery in the calculator as the dead battery may leak and cause damage to the calculator.
- To use the calculator in the low battery condition may have improper operation, stored memory may be corrupted or lost completely. Keep written records of all important data. Once there is a low battery condition replace the battery as soon as possible.

SPECIFICATIONS

Power Supply : Single Lithium battery (CR2032 x 1)
Power Consumption : DC 3.0V / 0.3mW
Battery Life : Approximately 3 years
(Base on 1 hour operation per day)
Auto power off : Approx. 7 minutes
Usable Temperature : 0° ~ 40°C (32°F ~ 104°F)
Size: 171 (L) × 86 (W) × 18.75 (H) mm (with cover) /
6-47/64" × 3-25/64" × 47/64" (with cover) /
168 (L) × 80 (W) × 14.5 (H) mm (without cover) /
6-19/64" × 3-5/32" × 37/64" (without cover)
Weight: 128 g (4.33 oz) (with cover) /
95.59 g (2.23 oz) (without cover)
*Specifications are subject to change without notice.

- Recommend Photo Card size for cutting and inserting into hard case. Size : 161mm (H) x 73.5mm (W)

For CA, USA Only
Included battery contains perchlorate material - special handling may apply.
See http://www.dtsc.ca.gov/hazardouswaste/perchlorate/ for detail.

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